

CLAIMS

We claim:

1. 1. In a wireless communication system with a plurality of base stations communicating indirectly with a plurality of wireless communications devices through a plurality of repeaters, a method for more efficient use of radio spectrum, comprising:
 - 5 communicating indirectly between a first base station and a wireless communication device using a first repeater and a first RF backhaul link;
 - 6 controlling a first smart antenna system of said first base station for improved spectral efficiency by selectively configuring said first smart antenna system to spatially isolate communications on said first RF backhaul from communications on a second RF backhaul of a second repeater.
- 21 2. The method according to claim 1 wherein said communicating step further comprises said first base station communicating with a second wireless communication device using said second repeater and said second RF backhaul link.
- 2 3. The method according to claim 1 wherein said second repeater communicates with a second base station located in a communication cell separate from said first base station.
- 1 4. The method according to claim 3 further comprising selectively controlling a second smart antenna system of said second base station for improved spectral efficiency by selectively configuring said second smart antenna system to spatially isolate communications on said second RF backhaul link from communications on

5 said first RF backhaul link.

1 5. The method according to claim 1 wherein said controlling step further
2 comprises selecting from an antenna array at least one antenna element for use by
3 said first base station in producing a directional antenna pattern having a major lobe
4 in the direction of said first repeater.

1 6. The method according to claim 5 wherein said controlling step further
2 comprises selecting a plurality of antenna elements from said antenna array for use
3 by said first base station and adjusting at least one of a phase and amplitude of RF
4 signals received and transmitted by said plurality of antenna elements to produce
5 said directional antenna pattern.

1 7. The method according to claim 5 wherein said controlling step further
2 comprises selecting a plurality of antenna elements from said antenna array for use
3 by said base station and adjusting at least one of a phase and amplitude of RF
4 signals received and transmitted by said plurality of antenna elements to produce a
5 null in said directional antenna pattern, said null selectively directed toward said
6 second repeater.

1 8. In a wireless communication system with a plurality of base stations
2 communicating indirectly with a plurality of wireless communications devices
3 through a plurality of repeaters, a system for providing more efficient use of radio
4 spectrum, comprising:

5 a first base station configured for communicating indirectly with a wireless
6 communication device using a first repeater and a first RF backhaul link;
7 a first smart antenna system operatively associated with said first base
8 station, said first smart antenna system selectively configured by a control

9 processor for spatially isolating communications on said first RF backhaul from
10 communications on a second RF backhaul of a second repeater.

1 9. The system according to claim 8 wherein said first base station
2 communicates with a second wireless communication device using said second
3 repeater and said second RF backhaul link.

4 10. The system according to claim 8 wherein said second repeater
5 communicates with a second base station located in a communication cell separate
6 from said first base station.

7 11. The system according to claim 10 wherein said second base station
8 comprises a second control processor for selectively controlling a second smart
9 antenna system of said second base station for spatially isolating communications
10 on said second RF backhaul link from communications on said first RF backhaul
link.

1 12. The system according to claim 8 wherein said control processor selects from
2 an antenna array at least one antenna element for use by said first base station,
3 and said at least one antenna element produces a directional antenna pattern
4 having a major lobe in the direction of said first repeater.

1 13. The system according to claim 12 wherein said control processor selects a
2 plurality of antenna elements from said antenna array for use by said first base
3 station and said first smart antenna system includes phase and amplitude
4 controllers for adjusting at least one of a phase and amplitude of RF signals
5 received and transmitted by said plurality of antenna elements to produce said

6 directional antenna pattern.

1 14. The system according to claim 7 wherein said control processor selects a
2 plurality of antenna elements from said antenna array for use by said first base
3 station and said first smart antenna system includes phase and amplitude
4 controllers for adjusting at least one of a phase and amplitude of RF signals
5 received and transmitted by said plurality of antenna elements to produce a null in
6 said directional antenna pattern, said null selectively directed toward said second
7 repeater.